Investigation of the interface structure in sputtered WSi_2/Si multilayers by in-situ synchrotron X-ray scattering

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Abstract

In this study, WSi_2 and Si amorphous thin films were grown by dc magnetron sputtering in a vacuum chamber with 10^{-8} Torr base pressure. In-situ synchrotron X-ray diffuse scattering (XDS) with high spatial and temporal resolution has been employed to probe the surface and interface roughness evolution during film deposition. For roughness analysis, the X-ray reflectivity data simulations were performed using the IMD code. It is found that the structure of WSi_2/Si multilayers has an alternately smooth and rough interface. The ion energy and flux assisting the growth and the adatom's energy are responsible for this alternate interface structure.

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